

PROMOTION RECOMMENDATION  
The University of Michigan  
School of Dentistry

Fei Liu, associate professor of dentistry, with tenure, School of Dentistry, is recommended for promotion to professor of dentistry, with tenure, School of Dentistry.

Academic Degrees:

Ph.D.	2006	University of Connecticut Health Center, Farmington Connecticut
DDS	1999	West China School of Stomatology, Sichuan University, Chengdu
MS	1996	West China School of Stomatology, Sichuan University, Chengdu
BDS	1996	West China School of Stomatology, Sichuan University, Chengdu

Professional Record:

2017-present	Associate Professor, with tenure, Biologic and Materials Sciences and Prosthodontics, School of Dentistry, University of Michigan
2009-2017	Assistant Professor, Biologic and Materials Sciences and Prosthodontics, School of Dentistry, University of Michigan
2006-2009	Adjunct clinical lecturer, without tenure, Biologic and Materials Sciences and Prosthodontics, School of Dentistry, University of Michigan

Summary of Evaluation:

**Teaching:** Professor Liu's training as a bone biologist and board-certified prosthodontist provides him with the unique understanding to teach the relevance of basic sciences as it relates to clinical application, which is well received by his students. His teaching provides knowledge for students to understand why the subject is important, how it works, what we know about it, and how it can improve the health and wellbeing of dental patients.

In 2020, Professor Liu was appointed as the associate chair of prosthodontics in the Department of Biologic and Materials Sciences and Prosthodontics at the School of Dentistry. In this role, he became the course director in six graduate level courses relating to clinical prosthodontics, complex prosthodontic treatment planning, prosthodontic implants, thesis investigation and prosthodontic master's thesis research, and he lecturers in three additional courses at the graduate and pre-doctoral levels. In rank, he has been the chair or advisor on four PhD student projects and has served as mentor to ten graduate students. He has been an advisor to two pre-doctoral student projects and five visiting scholars. He has mentored three post-doctoral trainees in his laboratory. Professor Liu's student teaching scores are uniformly high with comments stating his support and eagerness to help students, his ability to explain the materials and concepts clearly, and how students admired his early approach to preparing students to do their master's thesis, for successful outcomes. His peers admire his outstanding lectures and student engagement. Evidence of Dr. Liu's outstanding mentorship is the 19 student who achieved research awards since he has been in rank.

**Research:** Professor Liu's basic research interest is in skeletal, craniofacial bone development and regulation. His clinical research interests are in dental implant, prosthodontics and digital

dentistry. Currently, he is the co-principal investigator on two foundation grants and co-investigator on one additional. In rank, he shows one large grant from the National Institutes of Health (NIH), three institution awards, and two school awards, all as the principal investigator. Professor Liu has 56 total peer-reviewed publications, 21 of are in his current rank, and 14 of those he is the corresponding author. All of these publications are in highly regarded international journals. He collaborates nationally and internationally evidenced by his many co-authorships, as well as his seven invited presentations at professional meetings and symposiums. Professor Liu is an accomplished independent investigator who has produced substantial scholarly output in both basic research and clinical arenas. His contributions are recognized by his colleagues, demonstrated by him being elected as a fellow of the American Society for Bone and Mineral Research and American College of Prosthodontics (2021).

Professor Liu is a bone biologist and prosthodontist, who has exhibited a commitment to biomedical research for 26 years with a major focus on autophagy biology and the mechanisms of Tsc1/mTORC1 and FAK in bone metabolism. More specifically, his laboratory has defined the important roles of autophagy, specifically FIP200, in bone development and hematopoietic stem cell maintenance, with findings published in renowned journals. His laboratory is also studying the roles of Tsc1/mTORC1 in craniofacial bone development. He has generated transgenic mouse models for bone research that include the roles of Focal Adhesion Kinase (FAK) in bone metabolism. He has successfully generated an animal model for Tuberous Sclerosis (TSC) to explore the role of Tsc1/mTORC1 in signaling in cranial base development, bone quality, and osteocytes. Furthermore, Professor Liu has made significant contributions to clinical science by publishing novel clinical techniques and documenting the interdisciplinary dental management of different patients.

#### Recent and Significant Publications

- Choi, HK, Yuan H, Fang F, Wei X, Liu L, Li Q, Guan JL, Liu F. TSC1 regulates the balance between osteoblast and adipocyte differentiation through autophagy/Notch1/ $\beta$ -catenin cascade, *Journal of Bone and Mineral Research* 2018 Nov;33(11):2021-2034.
- Qi S, Sun X, Choi HK, Wang L, Yao J, Wu G, He Y, Pan J, Guan JL, Liu, F. FAK promotes early osteoprogenitor cell proliferation by enhancing mTORC1 signaling. *Journal of Bone and Mineral Research* 2020 Sep;35(9):1798-1811.
- Hsieh Y, Wei X, Wang Y, Zhang H, Qi S, Xie D, Mishina Y, Mendonça D, Hatch N, Liu F. Chondrocyte Tsc1 controls cranial base bone development by restraining the premature differentiation of synchondroses. *Bone*. 2021 Dec; 153: 116142.
- Qi S, Wang Y, Wei X, Xie D, Mohsen R, Hsieh YL, Mishina Y, Liu F. Expression of Cre recombinase in chondrocytes causes abnormal craniofacial and skeletal development. *Transgenic Research*. 2022 Jun;31(3):399-411.
- Li J, Teixeira W, Saglik B, Liu F. Three-dimensionally printed template for locating screw channel in cement-retained implant-supported crown: A digital workflow. *Journal of Prosthetic Dentistry*. 2022 Sep 16;S0022-3913(22)00493-0.

Service: Professor Liu is a dedicated faculty member at the University of Michigan School of Dentistry and has made substantial contributions across various domains in academic service and patient care. As a board-certified prosthodontist, he specializes in complex prosthodontic procedures, particularly for patients with compromised general health, congenital diseases, and

traumatic injuries. His expertise lies in the precise placement of dental implants, requiring meticulous planning and coordination with surgeons, orthodontists, and other specialists. Beyond clinical practice, Professor Liu actively engages in academia, serving on numerous committees at the department, school and university levels, demonstrating a strong commitment to dental education and research. His involvement extends to national and professional organizations, including the American Academy of Fixed Prosthodontics, and the American College of Prosthodontists, where he contributes significantly to research initiatives and promotes awareness of prosthodontic advancements.

In Professor Liu's recent administrative roles, including serving as the interim director for graduate prosthodontics (2021-present) and interim department chair of the Department of Biologic and Materials Sciences (2022-2023), he displayed exemplary leadership qualities. He successfully enhanced the department's educational programs, improved clinic training, and fostered collaborations with other departments. Through strategic planning, Professor Liu significantly increased the department's collection of revenues, and strengthened faculty and student support systems in the department. His servant leadership approach is evident in his efforts to support faculty development, streamline administrative operations, and imitate collaborations to enhance the overall efficiency and transparency of the department.

Since 2020, Professor Liu has been the associate chair of prosthodontics in the Department of Biologic and Materials Sciences and Prosthodontics. In rank, he has served on seven national and international faculty searches. He has served on two internal department faculty review committees and has been a member of the Dr. Dziewiatkowski Award Committee four times. He served on the School of Dentistry Executive Committee 2018-2021, three-time University of Michigan School of Dentistry Research Day judge, and numerous Ph.D. Admissions Committees. At the university level, he has been a three-time judge for the Annual University of Michigan Musculoskeletal Symposium. At the national level, Professor Liu has served on numerous research award review committees, was a board director for the American Academy of Fixed Prosthodontics and was the chair of the Tylman Research Committee for the American Academy of Fixed Prosthodontics. He serves on the *Journal of the American Dental Association (JADA) Foundational Science*, and *Current Medicine* editorial boards, and he is a manuscript reviewer on 17 national and international scientific journals. In 2021, he served on the NIH study section "Aging effects on osteoimmunology." Professor Liu is an attending staff prosthodontist at the University of Michigan Hospital.

#### External Reviewers:

Reviewer A: "Dr. Liu's major contribution is in the areas of bone biology study and prosthodontics. His accomplishments in the areas of research and scholarly activity are well above what is achieved by his peers at the same rank. Dr. Liu has consistently demonstrated by his commitment and his leadership role in bone biology study and Prosthodontics that he is a desirable and valuable member of the profession."

Reviewer B: "Dr. Liu was the Associate Chair of Prosthodontics (2020-2022) and currently serves as interim Program Director of Graduate Prosthodontics and interim Chair, Department of Biologic and Materials Sciences and Prosthodontics. In addition to these significant administrative commitments, he has been involved in a number of school and university

committees. He has also been involved in research-related committees of national professional societies. He is a sought-after reviewer of manuscripts for peer review journals.”

Reviewer C: “His scholarship is strong in the area of autophagy and the role this plays in bone modeling and remodeling and the impact of FAK in the regulation of craniofacial growth. This is well supported by the publications in this area and the research support he has achieved to date. More recently, he also has been working in more director clinical applications of clinical digital technologies in supporting prosthodontic patient care. It is my impression his laboratory research is the strongest part of his portfolio.”


Reviewer D: “Dr. Liu’s important studies, which have been published in highly reputable Journals of the scientific literature, are novel and intriguing, providing great insight into the mechanisms of osteoblast differentiation and function, bone homeostasis and bone metabolism and reveal potential targets for therapeutic interventions for bone diseases such as osteoporosis, fracture healing or periodontitis.”

Reviewer E: “Dr. Liu’s educational background includes a certificate in prosthodontics, a PhD in biomedical sciences, plus a postdoctoral fellowship in cellular and molecular biology. Collectively, that combination of education and training provides an excellent foundation for clinical scientists, who is a valuable asset for any dental school”

Reviewer E: “Dr. Liu has been well-funded by university, corporate and federal agencies, up to a total of \$3,003,343 to support his research activities. He currently has two pending grants from the Osseointegration Foundation and NIH. He is also very persistent in submitting grants to fund his research. The number of peer-reviewed publications in high-quality journals and grants obtained show his genuine interest and the potential sustainability of his research.”

Summary of Recommendation:

Professor Liu is an invaluable faculty member to the School of Dentistry. His service to the school and Department of Biologic and Materials Sciences and Prosthodontics, as well at the national and international levels, is substantial and impactful. He has made significant contributions in his field by advancing the understanding of craniofacial bone formation and bone mass regulation. It is with the support of the Executive Committee, that I recommend Fei Liu for promotion to professor of dentistry, with tenure, School of Dentistry.



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Jacques E. Nör,  
Dean, School of Dentistry

May 2024